

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-115357

(43)Date of publication of application : 18.04.2003

(51)Int.Cl.

H01R 13/648

H01R 13/52

H05K 9/00

(21)Application number : 2001-305814

(71)Applicant : YAZAKI CORP

(22)Date of filing : 01.10.2001

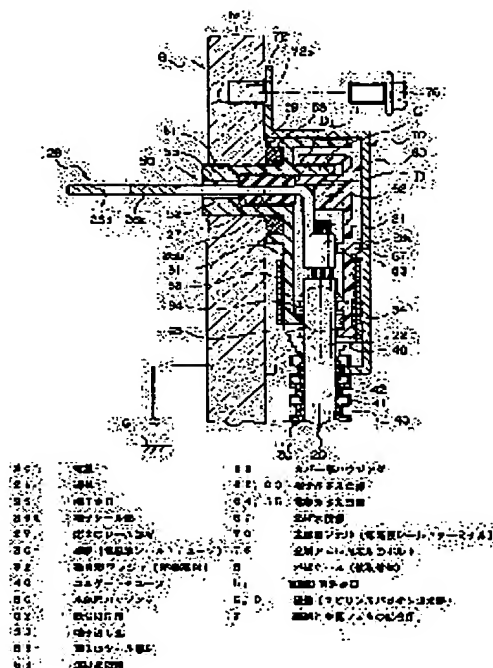
(72)Inventor : IKEDA TOMOHIRO

## (54) ELECTROMAGNETIC WAVE SHIELDING STRUCTURE EQUIPPED WITH WATERPROOFING NATURE

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide electromagnetic wave shield structure where the waterproofing nature of the part, in which the terminal connection is carried out by drawing in an electric wire in a shell case, is securable.

**SOLUTION:** A braid 30, which covers the electric wire 20, is combined with a metal shell 70 simply and certainly with eyelet form washers and bolts which are the joint means. The metal shell 70 is combined with a thing carried out earth grounding G for example the a shell case B, and the electromagnetic wave generated from the electric wire 20 proceeds in such the braid 30 → the eyelet type washer and the bolt → the metal shell 70 → the shell case B → the earth grounding G. The main part housing 50 of the electric connector is carried out insertion-coupling and holding at the electric wire drawing-in opening b1 of the shell case B, and secures the waterproof nature at the electric wire drawing-in opening b1 by a 1st seal component 55. Let which it is combined with the shell case B of a motor, and, carried out be. Moreover, a terminal metal parts 26 is inserted penetrating the main part housing 50 through a 2nd seal component 27. Therefore, water, oil, or the like from the inside of the shell case B does not reach to the electricity feeding conductor 21 of the electric wire 20 by the 2nd seal component 27.



## LEGAL STATUS

[Date of request for examination]

03.02.2004

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

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CLAIMS

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[Claim(s)]

[Claim 1] Electrical connector housing made of resin by which fitting maintenance was carried out where watertightness is secured to the service entrance prepared in the conductive attached body and this conductive attached body by the side of the device by which ground touch-down was carried out through the 1st seal member, The terminal metallic ornaments which it was stuck [ metallic ornaments ] to the conductor of the terminal of an electric wire by pressure, and waterproofness was secured and inserted [ metallic ornaments ] in said electrical connector housing through the 2nd seal member which is made to stick to the part and is held, and made the connection at a tip project inside said attached body, While being combined with said attached body in the conductive electromagnetic wave sealed tube equipped with wrap flexibility for said electric wire covering the overall length, and the condition of having covered said electrical connector housing and having held in the interior Electromagnetic wave shielding structure equipped with the waterproofness characterized by having the conductive electromagnetic wave shielding terminal which combines and holds said electromagnetic wave sealed tube by the conductive coupling means.

[Claim 2] Electromagnetic wave shielding structure equipped with the waterproofness according to claim 1 characterized by said coupling means which said electromagnetic wave sealed tube is [ coupling means ] a tubed braid, and makes it hold in said electromagnetic wave shielding terminal consisting of a bolt which lets pass and \*\*\*\*\* to a metal washer member and this.

[Claim 3] Electromagnetic wave shielding structure equipped with the waterproofness according to claim 2 characterized by for said washer member being an eyelet form washer, and pushing apart the mesh of the both ends which put the skirt edge of said braid on the duplex, making said eyelet form washer hang, and \*\*\*\*\* (ing) through said bolt to this eyelet form washer.

[Claim 4] Body section housing made of resin by which fitting maintenance is carried out at the service entrance of said attached body after said electrical connector housing has held the terminal section and said terminal metallic ornaments of said electric wire, Covering section housing made of resin which combines with this body section housing, is assembled, presses the terminal section and the terminal metallic ornaments of an electric wire from behind, has two incomes with body section housing, and is held, since -- the mutual bond part of body section housing and covering section housing Electromagnetic wave shielding structure equipped with the waterproofness according to claim 1 characterized by becoming intricate from one side alternately to the other side, and being formed so that it may become the water flow way of the labyrinth configuration for guiding and missing infiltration inflow.

[Claim 5] Electromagnetic wave shielding structure equipped with the waterproofness according to claim 4 characterized by having prepared the road mirage step which forms the water flow way of a cross-section concave form between the external surface of said attached body in said body section housing, and preparing the road mirage step which, on the other hand, forms the water flow way of a cross-section concave form between the insides of said electromagnetic wave shielding terminal in the external surface of said covering section housing.

[Claim 6] Electromagnetic wave shielding structure equipped with the waterproofness according to claim 5 characterized by said road mirage step inclining in Yamagata.

[Claim 7] Electromagnetic wave shielding structure equipped with the waterproofness according to claim 1 or 4 characterized by said terminal metallic ornaments having come to insert in the one apparatus seal member in the state of adhesion while carrying out fitting of the one apparatus seal member which unified said 1st seal member and said 2nd seal member to the service entrance of said attached body in the state of adhesion and stopping it in said body section housing.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to the electromagnetic wave shielding structure equipped with the waterproofness of the part which connects an electric wire and a cable, and wire harness to the input/output terminal of the motor of loading in an electric vehicle, or the input/output terminal of a common electronic electrical machinery and apparatus.

[0002]

[Description of the Prior Art] In recent years, the increment of a weak-electric-current circuit or an electronic circuitry is being enhanced increasingly, an automobile protects a weak weak-electric-current circuit in an electromagnetic wave noise, while the high current and high-voltage-ization of a \*\*\*\* electric wire progress, and effective and the cure against electromagnetic wave shielding of low cost are demanded so that detection precision of the various sensors in an electronic circuitry may not be reduced under the effect of an electromagnetic wave noise.

[0003] Drawing 10 is the side-face sectional view showing the connector for shielded cables of a publication in JP,6-23179,U as a conventional example of this electromagnetic wave shielding structure. Two or more pin terminals 3 are held at the retainer 2 for terminal maintenance prepared in the cylinder-like metal shell 1. a shielded cable 4 -- conductors, such as copper wire, -- two or more [ of the insulating line center 5 which covered 5a with insulator 5b ] are twisted, the metal braid 6 is twisted from this twisted insulating line center 5, and it has come to cover with the sheath 7 of the outermost layer on it each terminal of the insulating line center 5 of such a shielded cable 4 -- scalping -- a conductor -- 5a is connected to a pin terminal 3. Moreover, scalping treatment of the sheath 7 of a cable end was carried out, the braid 6 was exposed, on the skirt edge of this braid 6, the tubed metal network 8 was put and heat-shrinkable tubing 9 is further put from on this metal network 8. Heat-shrinkable tubing 9 is made to heat and the metal network 8 is pressed down from a top with the shrinkage pressure, and by pressing the metal network 8 against the peripheral face of the metal shell 1, and connecting, the metal shell 1 is made to flow electrically through the metal network 8 from a braid 6, the electromagnetic wave generated from each insulating line center 5 of a shielded cable 4 is absorbed, and it shields.

[0004] For example, in the case of the motor carried in the electric vehicle, the cure against shielding is demanded from the electromagnetic wave generated from the power-source electric wire connected to the input/output terminal, a cable, etc. The shell plate cases of a motor are metal, such as aluminum, they insert an electrical connector in the service entrance prepared in the shell plate case, fix to it, and draw a power-source electric wire etc. in a shell plate case through an electrical connector. When connecting the terminal of the drawn electric wire to a motor input/output terminal through terminal metallic ornaments in that case, it is necessary to protect from the effect of the electromagnetic wave which prevents the electromagnetic wave leakage to the exterior from the power-source electric wire of a high current and the high voltage etc., and is conversely received from the exterior. Then, he is trying to aim at a shielding flow by carrying out ground touch-down and dropping a metal shell plate case to a gland.

[0005] The waterproofness which protects that storm sewage etc. permeates into a case from the service entrance prepared in coincidence in this case at the shell plate case of not only a cure against electromagnetic wave shielding such but a motor is also required.

[0006] Drawing 11 is the side-face sectional view showing an example of the terminal waterproofing structure of the electrical connector fixed to the service entrance. The shell 12 made of resin is fitted in and fixed to the service entrance 11 prepared in the shell plate case 10 of a motor in this case as a connector body. That is, carry out fitting of the anterior part of the body cylinder part 13 of the shell 12 made of resin

to a service entrance 11, and it is made to stick so that the fixed seat 14 prepared in the body cylinder part 13 at the flange configuration may be pressed against the external surface of the shell plate case 10, and fixes. Moreover, the septum 15 is formed in the interior of the body cylinder part 13, and an electric wire 16 is made to insert in the center section of a septum 15, and it draws in the interior of the shell plate case 10. an electric wire 16 -- pre-insulation material, such as insulator 16a of a terminal, -- scalping processing -- carrying out -- a conductor -- the conductor which was made to expose 16b and was exposed -- the terminal metallic ornaments 17 are caulked and stuck to 16b by pressure by caulking section 17a. The terminal metallic ornaments 17 are concluded by connection hole 17b of a point through a bolt at a motor input/output terminal.

[0007] In order that the waterproofing means in this case may protect permeation of storm sewage etc. from a service entrance 11 in the shell plate case 10, it was pressed as the fixed seat 14 of the shell 12 made of connector side resin fixed to the external surface of the shell plate case 10 by pressing, and has equipped face-to-face with O ring 18. Furthermore, the outside of a septum 15 is equipped with the tubed packing 19 made of rubber, and this packing 19 is made to stick and insert an electric wire 16 in the part which an electric wire 16 inserts in by the septum 15 of the shell 12 made of resin. It was made such, and the waterproofness over a service entrance 11 is O ring 18, and the waterproofness in the insertion section of the shell 12 made of resin and an electric wire 16 is secured by packing 19, respectively.

[0008]

[Problem(s) to be Solved by the Invention] In the case of the terminal waterproofing structure of the connector for shielded cables of drawing 10 shown as a conventional example as mentioned above, and drawing 11, the following trouble is in each.

[0009] First, it is that the heat-shrinkable tubing 9 which pushes against the metal shell 1 the metal network 8 which covers a braid 6 as a bond member for making the metal shell 1 of a connector body carry out the shielding flow of the braid 6, and the metal network 8 is formed in one of the troubles in the case of the connector for shielded cables of drawing 10. Therefore, and an activity man day, a special processing facility, etc. which apply heat and are shrunk increase, and member mark are also attached to cost quantity.

[0010] moreover, although one comes out about the electromagnetic wave shielding function which is the original purpose, just the heat shrink force by heat-shrinkable tubing 9 of the force which pushes the metal network 8 against the metal shell 1 is inadequate [ \*\* ]. Therefore, shielding resistance cannot realize unstable and effective electromagnetic wave shielding ability, either, but lacks in dependability. In addition, when heat-shrinkable tubing 9 receives the damage on a tear etc. temporarily, there is concern which the metal network 8 separates, and it becomes impossible to play the role of the bond of the metal shell 1 and a braid 6, causes electric un-flowing, and spoils an original electromagnetic wave shielding function.

[0011] the conductor of the electric wire 5 of the part which, on the other hand, stuck the terminal metallic ornaments 6 by pressure although it might be [ structure / which is shown in drawing 11 / terminal waterproofing ] common also about drawing 10 -- a problem is in the point which 5a showed and has been projected inside the motor shell plate case 10 in the condition. a conductor with oil, such as a lubricating oil used, and the waterdrop generated inside the case unreserved in the case of a motor -- it is transmitted to 5a, leaks out to the case exterior, and gives various un-arranging to other equipments. The cure which prevents it takes high cost.

[0012] As mentioned above, the purpose of this invention is especially in the motor of loading in an electric vehicle to offer the electromagnetic wave shielding structure where electromagnetic wave shielding ability was moreover effectively obtained by low cost after securing the waterproofness of the part which draws and carries out terminal strapping of the electric wire to the shell plate case.

[0013]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the electromagnetic wave shielding structure equipped with the waterproofness according to claim 1 concerning this invention The conductive attached body B by the side of the device by which ground touch-down was carried out as shown in drawing 1 - drawing 5 Electrical connector housing made of resin by which fitting maintenance was carried out where waterproofness is secured to the service entrance b1 prepared in this attached body B through the 1st seal member 55 (50 60), Waterproofness is secured and inserted in said electrical connector housing through the 2nd seal member 27 which is stuck to the conductor 21 of the terminal of an electric wire 20 by pressure, is made to stick to the part, and is held. The terminal metallic ornaments 26 which made connection 26c at a tip project inside said attached body B, While being combined with said attached body B in the conductive electromagnetic wave sealed tube 30 equipped with wrap flexibility for said electric wire 20 covering the overall length, and the condition of having covered said electrical connector

housing and having held in the interior It is characterized by having the conductive electromagnetic wave shielding terminal 70 which combines and holds said electromagnetic wave sealed tube 30 by the conductive coupling means.

[0014] From the above configuration, the braid 30 which shows an electric wire 20 to below drawing 2 as an example of a wrap electromagnetic wave sealed tube is combined with the electromagnetic wave shielding terminal like the metal shell 70 by the coupling means. Since it is combined with the attached body B with which ground touch-down of the device side like the shell plate case of a motor was carried out between metals as the metal shell 70 is shown in drawing 5 for example, the electromagnetic wave generated from an electric wire 20 is absorbed in the shielding flow path by the path of the shell plate case B-> ground touch-down G of the body attached [ braid 30 -> coupling means -> metal shell 70 -> ]. On the other hand, although fitting maintenance of the electrical connector housing which consists of body section housing 50, covering section housing 60, etc. is carried out at the service entrance b1 of the shell plate case B which is the attached body, the waterproofness in the service entrance b1 is secured by the 1st seal member 55, and storm sewage etc. prevents infiltrating into the interior of the shell plate case B from a service entrance b1. Moreover, the terminal metallic ornaments 26 are projected inside the shell plate case B in the condition of having inserted in the body section housing 50 of the above-mentioned electrical connector housing through the 2nd seal member 27 which is made putting on this part and is held. Therefore, water and oil which are going to be transmitted to the terminal metallic ornaments 26, and it is going to leak from the interior of the shell plate case B to the exterior are intercepted by the 2nd seal member 27, and even the conductor 21 of the unreserved condition of an electric wire 20 does not attain them, and they are leaked neither to the shell plate case exterior nor the housing exterior.

[0015] Moreover, electromagnetic wave shielding structure equipped with waterproofness according to claim 2 is characterized by said coupling means which said electromagnetic wave sealed tube is [ coupling means ] the tubed braid 30, and makes it hold in said electromagnetic wave shielding terminal 70 consisting of a bolt which lets pass and \*\*\*\*\* to the metal washer member 32 and this.

[0016] From the above configuration, the braid 30 which is an electromagnetic wave sealed tube knits a conductive metal strand to tubed. It is firmly [ certainly and ] combinable with the electromagnetic wave shielding terminal like the metal shell 70 in the washer member 32 and a bolt being about this braid 30. Conventionally which is shown in drawing 10 , with structure, a bond member called the metal network 8, heat-shrinkable tubing 9, etc. for carrying out the shielding flow of the braid 6 was needed for the metal shell 1, and the special heating facility for carrying out the heat shrink of the heat-shrinkable tubing 9 was needed. since what is necessary is to use only the easy and positive coupling means of the washer member 32 and a bolt by this invention to it, it is markedly alike also in cost, and it is cheap, and ends, and the electromagnetic wave shielding structure which is moreover reliable can be acquired.

[0017] Moreover, said washer member 32 is an eyelet form washer, and the electromagnetic wave shielding structure equipped with waterproofness according to claim 3 pushes apart the mesh of the both ends which put the skirt edge 31 of said braid 30 on the duplex, makes said eyelet form washer 32 hang, and is characterized by \*\*\*\*\* (ing) through said bolt to this eyelet form washer 32.

[0018] It is the case where the metal eyelet form washer shown below in drawing 2 as a washer member 32 is used from the above configuration. Conventionally which is shown in drawing 10 , in comparison with the coupling means by the metal network 8 and heat-shrinkable tubing 9 of structure, the coupling means which added the bolt to this eyelet form washer 32 is very easy, and, moreover, has certainty.

[0019] Moreover, the electromagnetic wave shielding structure equipped with waterproofness according to claim 4 As shown in drawing 1 , said electrical connector housing The body section housing 50 made of resin by which fitting maintenance is carried out at the service entrance b1 of said attached body B where the terminal section and said terminal metallic ornaments 26 of said electric wire 20 are held, The covering section housing 60 made of resin which combines with this body section housing 50, is assembled, presses the terminal section and the terminal metallic ornaments 26 of an electric wire 20 from behind, has two incomes with the body section housing 50, and is held, since -- the mutual bond part of the body section housing 50 and the covering section housing 60 is characterized by becoming intricate from one side alternately to the other side, and being formed so that it may become the water flow way of the labyrinth configuration for guiding and missing infiltration inflow.

[0020] Electrical connector housing consists of body section housing 50 and covering section housing 60, and the septa C and D ( drawing 1 , drawing 3 ) prepared for the both sides of the part which combines the Ryobe housing 50 and 60 are made to become intricate alternately from the above configuration ( drawing 5 ). The complicated clearance forms the water flow way like a maze, even when storm sewage etc.

permeates into housing temporarily, it shows around on the water flow way, and it escapes to the housing exterior. That is, the structure of electrical connector housing itself is equipped with the "waterproof" function.

[0021] Moreover, electromagnetic wave shielding structure equipped with waterproofness according to claim 5 is characterized by having formed the road mirage step 59 which forms the water flow way of a cross-section concave form between the external surface of said attached body B in said body section housing 50, and form the road mirage step 67 which, on the other hand, forms the water flow way of a cross-section concave form between the insides of said electromagnetic wave shielding terminal 70 in the external surface of said covering section housing 60.

[0022] It is also in the above configuration to this case about the waterproofing reproductive function of the structure of the body section housing 50 and the covering section housing 60 itself. That is, "the water flow way of a cross-section concave form" is formed [ by having formed the road mirage steps 59 and 67 in each body 51 and 61 of a case ] in the external surface of the shell plate case B where the body section housing 50 which is each phase hand part material is the attached body by the side of a device, between the insides of the metal shell 70 whose covering section housing 50 is an electromagnetic wave shielding terminal at the time of assembly. Therefore, the storm sewage which permeated into housing is transmitted in the water flow way of these cross-sections concave form, and escapes to the housing exterior.

[0023] Moreover, electromagnetic wave shielding structure equipped with waterproofness according to claim 6 is characterized by said road mirage step (sign 89 in drawing 6 ) inclining in Yamagata.

[0024] It replaces with said road mirage step 59 prepared in the body section housing 50 by the gestalt of the 1st operation shown in drawing 1 especially in this case from the above configuration, and if "Yamagata" like the road mirage step 89 established in the body section housing 80 of the gestalt of the 2nd operation shown in drawing 6 is made to incline, infiltration inflow becomes easy to flow and the wastewater to the exterior and the road mirage effectiveness can be heightened so much.

[0025] Here, as reference was made in above-mentioned claims 4, 5, and 6, the little [ easy as a packing member by India rubber material etc. and ] 1st and 2nd seal member 55 and 27 just needs to be used for having given various waterproofing functions to the structure of electrical connector housing itself, and it means that effective waterproofness is acquired.

[0026] Moreover, the electromagnetic wave shielding structure equipped with waterproofness according to claim 7 Like the gestalt of the 3rd operation which unifies said 1st seal member 55 and said 2nd seal member 27, and is shown in drawing 9 While carrying out fitting of the one apparatus seal member 140 to the service entrance b1 of said attached body B in the state of adhesion and stopping in said body section housing 110, it is characterized by said terminal metallic ornaments 26 having come to insert in the one apparatus seal member 140 in the state of adhesion.

[0027] Reduction-ization of still much more member mark is attained by collecting the little [ easy and ] 1st [ which was mentioned above ] and 2nd seal member 55 and 27 as an one apparatus seal member 140 from the above configuration.

[0028]

[Embodiment of the Invention] The gestalt of operation of the electromagnetic wave shielding structure hereafter equipped with the waterproofness concerning this invention is explained to a detail with reference to a drawing. drawing 1 - drawing 5 -- a book -- structure -- the -- one -- operation -- a gestalt -- being shown -- drawing 1 -- structure -- a principal piece -- it is -- an electrical connector -- decomposition -- a perspective view -- drawing 2 -- drawing 1 -- inside -- two -- a \*\* -- a primary member -- assembly -- a mode -- being shown -- decomposition -- a perspective view -- drawing 3 -- (-- a --) - (-- c --) -- drawing 1 -- inside -- three -- a \*\* -- a primary member -- respectively -- another -- an include angle -- from -- be shown -- a perspective view -- drawing 4 -- drawing 1 -- inside -- two -- a \*\* -- a primary member -- assembly -- a mode -- be shown -- decomposition -- a perspective view -- and -- drawing 5 -- the above each part -- material -- from -- becoming -- assembly -- a side face -- a sectional view -- it is .

[0029] As an example of the attached body as used in the field of this invention, the sign B in drawing 5 shows the shell plate case of the motor of electric vehicle loading, and the electrical connector which is this structure is attached in the service entrance b1 penetrated and prepared in the metal shell plate cases B, such as aluminum, in this case. The electric wire and the cable, and wire harness (it is hereafter named the electric wire 20 generically for convenience) which have been \*\*\*\*(ed) from the dc-battery power source etc. through this electrical connector are drawn in the interior of the shell plate case B, it connects with a motor input/output terminal (not shown) that it is also with the terminal metallic ornaments 26 stuck to the electric-wire terminal by pressure, and an electric flow is aimed at. In that case, electromagnetic wave shielding



processing is performed so that the effect of an electromagnetic wave may not reach for the high current and high voltage which flows on an electric wire 20. It combines, and necessary water proofing is performed so that storm sewage etc. may not infiltrate into the interior of the shell plate case B from a service entrance b1. moreover, not only permeation prevention functions, such as storm sewage, but coincidence -- oil, such as the inside of the shell plate case B to a motor lubricating oil, -- the electric wire from the terminal metallic ornaments 26 -- it is also the structure of preventing effectively getting across to a conductor 21 and leaking out to the case exterior.

[0030] About the electric wire 20, the bundled thing which consists of 3 groups is shown by this example. It covers from a top covering the overall length of these electric wires 20 \*\*\*\*(ed) by the car body by taking about, and is equipped with the braid 30 which knit to tubed the conductive metal strand shown in each drawing as an example of a conductive electromagnetic wave sealed tube of having the flexibility as used in the field of this invention. Still together with the braid 30, three electric wires 20 are inserted in a corrugate tube 40 for a \*\*\*\* overall length or every key point, and protection is achieved. On the conductors 21, such as copper wire, an insulator 22 is extruded [ every / of an electric wire 20 ], it covers, has come, carries out scalping treatment of the insulator 11 of each terminal, exposes a conductor 21, and the terminal metallic ornaments 26 of the L character configuration at which it turned at the right angle mostly caulk that conductor 21 by this caulking section 26a, and it is stuck to it by pressure. Moreover, 26d of boltholes is prepared in connection 26c with the flat point of the terminal metallic ornaments 26, and an electric flow is achieved by concluding to a motor input/output terminal through a bolt.

[0031] In drawing 1 - drawing 4 , in order that the principal part of this structure which is an electrical connector may make the terminal metallic ornaments 26 of an electric-wire terminal insert in the shell plate case B and may hold them, it has the body section housing 50 and the covering section housing 60 whose all of an assembly type are resin mold goods. it -- in addition, both the housing 50 and 60 of an assembly condition was covered and held from the outside, and it has the metal shell 70 which is an electromagnetic wave shielding terminal as used in the field of this invention which presses against the external surface of the shell plate case B, and is combined with a bolt 76 ( drawing 5 ).

[0032] It has come to be able to carry out the temporary immobilization of the body section housing 50 on the outside of the shell plate case B by having the fitting attachment section 52 projected on the anterior part outside of the body 51 fabricated by the rectangle case, and fitting this fitting attachment section 52 into the service entrance b1 of the shell plate case B about the body section housing 50, first. Moreover, three terminal through holes 53 corresponding to the number of an electric wire 20 are penetrated and formed in the fitting attachment section 52 lining up side-by-side. The terminal metallic ornaments 26 are made to insert in the terminal through hole 53, and it is made to project inside the shell plate case B, and enables it to face connection 26c at a tip a connecting location with a motor input/output terminal. Moreover, as shown in drawing 3 (a), the packing wearing slot 56 was formed over the perimeter of the fitting attachment section 52, it was equipped with the 1st seal member 55 there as packing, and the waterproofness between the external surface of the shell plate case B and the body section housing 50 is secured. The 1st seal member 55 had stop pin 55a to both ends, stopped to stop slot 56a prepared in the above-mentioned packing wearing slot 56, and has prevented pulling out.

[0033] About waterproofing, further, level difference shaping is carried out along a both-sides side from the top face of the body 51 of a case of this body section housing 50, the road mirage step 59 is formed, and the device which infiltration inflow is made transmitted to the slot of a cross-section concave formed between case external surface, and is missed to a sink and the housing exterior in the condition of having pressed against the external surface of the shell plate case B is made. Furthermore, as three terminal through holes 53 are surrounded, three septa C are formed corresponding to the number of the terminal metallic ornaments 26. This septum C is alternately combined with the septum D [ drawing 3 (b)] formed in the covering section housing 60 explained below, has two incomes and forms the labyrinth packing water flow way like a maze, and even when water infiltrates into the interior of housing, it is devised so that it may show around and miss to the housing exterior. Moreover, Septum C also has the function to insulate three adjacent terminal metallic ornaments 26 of each other.

[0034] Here, again, about the terminal metallic ornaments 26, the neighborhood at which it turned at the right angle in the back section of connection 26c is processed with a stage somewhat smaller than the cross-section configuration of connection 26c, terminal seal section 26b is prepared in it, and as cartridge packing, the 2nd seal member 27 made of rubber sticks, and is inserted in and set-sized [ then, ].

[0035] Therefore, although these terminal metallic ornaments 26 are made to insert in the terminal through hole 53 of the above-mentioned body section housing 50, the seal member 27 of the above 2nd is stuffed



into the terminal through hole 53 in the state of adhesion in that case, and he is trying to secure the waterproofness between the terminal metallic ornaments 26 and the body section housing 50. Moreover, since the 2nd seal member 27 is located ahead of the conductor 21 of the unreserved condition of an electric wire 20, it is transmitted to the terminal metallic ornaments 26, and water and the oil from the interior of the shell plate case B show it, it reaches even a conductor 21, and also has the function in which un-arranging [ which is leaked to the case exterior ] is avoidable.

[0036] Next, about the covering section housing 60, as shown in drawing 3 (b), corresponding to a package of an electric wire 20 and the terminal metallic ornaments 26, the terminal presser-foot heights 62 and 63 and the cleat crevices 64 and 65 are formed in the before [ the body 61 fabricated by the rectangle case ] side. These concave heights are surrounded and \*\*\*\*(ed) by Septum D, respectively. Septum D is alternately combined with the septum C formed in the above-mentioned body section housing 60 side, and has the role which misses infiltration inflow to the housing exterior. Moreover, the upper limit section D1 of this septum D presses from back the seal member 27 of the above 2nd with which it equipped on the terminal metallic ornaments 26, and it pushes it in until it runs against the back wall of the terminal through hole 53 ( drawing 5 ).

[0037] About waterproofing, further, the road mirage step 67 of a rib tread type is horizontally extended and formed in the tooth back of the body 61 of a case of this covering section housing 60, infiltration inflow is made transmitted to the slot of a cross-section concave formed between the insides of the metal shell 70 explained below, and it misses to a sink and the housing exterior.

[0038] In the above body section housing 50 and covering section housing 60, the lock crevice 57 is formed in the both-sides side of the body 51 of a case of the body section housing 50, and the lock heights 66 made to engage with the lock crevice 57 are formed in the both-sides side of the body 61 of a case of the covering section housing 60. By making the lock concave heights 57 of these both sides, and 66 comrades engaged with click feeling, the body section housing 50 and the covering section housing 60 fit in by one-touch mostly, and are assembled.

[0039] Next, about the metal shell 70 to which press working of sheet metal etc. was carried out as a rectangle case, as typically shown in drawing 3 (c), cover and hold the above-mentioned housing 50 and 60 of an assembly condition from behind, through and the female screw hole b2 of the shell plate case B are made to screw a bolt 76 on bolthole 72a of the bracket 72 prepared in the upper part of the body 71 of a case, and it is concluded (drawing 5). Moreover, the lock hole 75 for a temporary arrangement is formed in the both-sides side of the body 71 of a case, and temporary positioning of the metal shell 70 by the side of housing is made by making the lock hole 75 engage with the lock heights 58 which protruded on the both-sides side of the body section housing 50. Furthermore, the bracket 74 for braid immobilization is formed in the lower part of the both-sides side of the body 71 of a case. The metal eyelet form washer 32 shown in drawing 2 and drawing 4 is incorporated as a washer member which is also a summary member of this invention, and through this eyelet form washer 32, with a bolt (not shown), the both ends of the skirt edge 31 of a braid 30 are \*\*\*\*\* (ed) to a bracket 74, and it fixes to bolthole 74a of the core of a bracket 74, and the slit 74 of a vertical pair.

[0040] Here, drawing 4 is the exploded view showing the condition of combining the skirt edge 31 of a braid 30 with the metal shell 70 using this eyelet form washer 32. The eyelet form washer 32 has bolt through hole 32a at the core, and has chip box pawl 32b of a Uichi Hidari pair at which it turned at the right angle from the seat rim. It bends after insertion to slit 74b which prepared through and chip box pawl 32b in the bracket 74 of the metal shell 70 as pushed apart the eyelet form washer 32 of such a configuration to the both ends near the skirt edge 31 of a braid 30. Furthermore, by bending chip box pawl 74c by the side of the metal shell 70, from an outside, as the skirt edge 31 of a braid 30 is held, it is pinched.

[0041] Make it such, make the metal shell 70 carry out bolt association of the braid 30 through the eyelet form washer 32, and carry out a shielding flow, and make the shell plate case B conclude the metal shell 70 with a bolt 76 further, it is made to flow, and a series of shielding flow paths until it ground touch-down G Carries out the shell plate case B are formed.

[0042] From the above configuration, an operation of the gestalt of the 1st operation concerning this invention is explained, mainly using the assembly side-face sectional view of drawing 5 . In addition, about an assembly procedure, it is not limited to the following explanation.

[0043] Three electric wires 20 are let pass and protected from from [ after bundling ] by the corrugate tube 40, where a braid 30 is put, and they are taken about and \*\*\*\*(ed) by the car body. At the terminal of each electric wire 20, by caulking section 26a, the terminal metallic ornaments 26 caulk the exposed conductor 21 which carried out scalping treatment, and are stuck to it by pressure, and further, it equips with the 2nd seal

member 27, is set-sized by terminal seal section 26b of the terminal metallic ornaments 26 as packing, and prepares for an assembly. Moreover, at the skirt edge 31 of a braid 30, an assembly is equipped also with this by pushing apart a mesh to the piled-up both ends and attaching the eyelet form washer 32 to them ( drawing 2 ).

[0044] Next, to the terminal through hole 53 of the body section housing 50, it pushes in and the terminal metallic ornaments 26 of each electric wire 20 are stuck until the 2nd seal member 27 goes and stops at \*\*\*\*. Connection 26c at the tip of the terminal metallic ornaments 26 becomes the form which projected outside from the fitting attachment section 52 of the body section housing 50 in this condition. The body section housing 50 can be beforehand equipped with the 1st seal member 55 in the packing wearing slot 56.

[0045] Then, as each electric wire 20 is covered from behind, the lock heights 66 of the both sides of the covering section housing 60 are made to engage with the lock crevice 57 of the both sides of the body section housing 50 by one-touch with click feeling. When the Ryobe housing 50 and 60 is combined and assembled, inside, the terminal metallic ornaments 26 are pressed down from behind by the terminal presser-foot heights 62 and 63 by the side of the covering section housing 60, and an electric wire 20 is also pressed down from behind in the cleat crevices 64 and 65 by the side of the covering section housing 60. The upper limit section D1 of the septum D of the covering section housing 60 presses the 2nd seal member 27 on the terminal metallic ornaments 26 from back in that case.

[0046] In this phase, the skirt edge 31 of a braid 30 is extended, the lower part section of the Ryobe housing 50 and 60 of a temporary-assembling condition is wrapped in from an outside, and that skirt edge 31 is twisted and bound tight in a binding tape or bands 33 from an outside in it ( drawing 5 ). It is made such and temporary positioning of an electric wire 20 and the terminal metallic ornaments 26 is carried out into the Ryobe housing 50 and 60.

[0047] Next, fitting of the fitting attachment section 52 of the body section housing 50 of the one side incorporating an electric wire 20 and the terminal metallic ornaments 26 is pushed in and carried out to the service entrance b1 of the shell plate case B of a motor in this case as a connection phase hand-loom machine. Connection 26c at the tip of the terminal metallic ornaments 26 will be in a projection and the condition of preparing for connection with a motor input/output terminal, inside the shell plate case B.

[0048] And the metal shell 70 is covered and held in the covering section housing 60 from behind. At this time, the eyelet form washer 32 beforehand attached in the skirt edge 31 of a braid 30 is inserted in slit 74b of the bracket 74 for braid immobilization of the lower both ends of the metal shell 70 like drawing 4 , chip box pawl 32b is bent, and it stops from an outside to slit 74b of a bracket 74. The outside of the skirt edge 31 of a braid 30 is made to bend and stop chip box pawl 74c by the side of the metal shell 70 furthermore. Then, bolthole 32a by the side of the eyelet form washer 32 and bolthole 74a by the side of a bracket 74 are aligned, and it \*\*\*\*\* through a bolt. Making it such, a braid 30 combines that the eyelet form washer 32 and a bracket 74 are also in about 31 skirt edge both ends with the metal shell 70. The broken-line circle shown with the sign in drawing 5 (J) shows the location which looked at the bond part of a braid 30 and the metal shell 70 from the side face. Following it, the lock hole 75 of the metal shell 70 is made to engage with the lock heights 58 for temporary positioning of the covering section housing 60, and temporary assembling is completed.

[0049] Next, this metal shell 70 is combined with the shell plate case B, and this positioning is performed. That is, in the bracket 72 of the upper limit of the metal shell 70, bolthole 72a is made to screw a bolt 76 in through and the female screw hole b2 of the shell plate case B, and it combines with it. A corrugate tube 40 is also fixed by making the lower limit section of the metal shell 70 eat away between San-ya 41 of a corrugate tube 40, and 42 in that case.

[0050] The shell plate case B is ground touch-down G Carried out, and each electromagnetic wave generated on an electric wire 20 is absorbed in the shielding flow path of the metal shell 70 -> bolt 76 -> shell plate case B-> gland G as a braid 30 -> eyelet form washer 32 -> electromagnetic wave shielding terminal by the conductive ingredient. By avoiding so that it may prevent that an electromagnetic wave is revealed to the exterior through the conductor 21 of a result and an electric wire 20 and may not be conversely electromagnetic wave influenced from the outside, the stable electrical property can be maintained and the dependability by wiring of an electric wire 20 can be raised.

[0051] On the other hand, it is made such, and under the use with the passage of time after connecting with a motor input/output terminal, when storm.sewage etc. permeates from the clamp face of the bracket 72 of the part which combined the metal shell 70 with the shell plate case B with the bolt 76, the road mirage step 59 currently formed in the cross section concave configuration in the infiltration inflow at the body section housing 50 is made transmitted, and it misses to the housing exterior. in addition -- and infiltration inflow

secures necessary waterproofness so that permeation inside may be prevented more than it and it may not be flooded inside a case from the service entrance b1 of the shell plate case B by the 1st seal member 55.

[0052] Moreover, when a motor lubricating oil etc. tends to be transmitted to the terminal metallic ornaments 26 and tends to infiltrate into an electric-wire 20 side, for example, it is prevented and it shows inside housing, and even the conductor 21 of the electric wire 20 of a condition does not reach, but is protected by the 2nd seal member 27 on the terminal metallic ornaments 26.

[0053] Moreover, when storm sewage etc. infiltrates into the clearance between the outermost metal shell 70 and the inside covering section housing 60, it is transmitted to the road mirage step 67 of the cross-section concave configuration currently formed in the tooth back of the covering section housing 60, and escapes to the housing exterior.

[0054] moreover, since both septa C and D become intricate alternately and, as for the doubling assembly side of the body section housing 50 and the covering section housing 60, form the maze like labyrinth packing even when storm sewage etc. infiltrate into the pan inside housing to the method of the back such, it do not reach to the important section which it show it to infiltration inflow, and miss to the housing exterior, and an electric wire 20 show, and need waterproofing, such as a conductor 21.

[0055] The main point of these operations is summarized to a degree.

\*\* Since the braid 30 is firmly \*\*\*\*\* (ed) by the metal shell 70 with the bolt through the eyelet form washer 32 of a washer member about electromagnetic wave shielding at the both ends of the skirt edge 31, contact of a shielding flow is enough. And it becomes possible only with small and easy components called the eyelet form washer 32. Electromagnetic wave shielding ability with a result and dependability is obtained.

\*\* What is necessary is just to use the 1st and 2nd seal member 55 and 27 as packing processing, since it is securable by forming the path for road mirages of the shape of labyrinth packing which the waterproofness of the service entrance b1 in \*\*\*\*\*, such as the motor shell plate case B, was established [ shape ] for the easy road mirage steps 59 and 67 for the structure of the electrical connector housing itself, and made Septa C and D become intricate alternately about waterproofing / oilproofness nature.

[0056] Next, drawing 6 - drawing 8 show the gestalt of the 2nd operation concerning this invention which should also be called modification of the gestalt of the 1st operation of the above. The explanation which gives the same sign to the member common to each part material shown with the gestalt of the 1st operation of drawing 1 - drawing 5, and overlaps is omitted.

[0057] If it is in this example, those the configurations of the body section housing 80 of resin mold goods and the covering section housing 90 and the configurations of the metal shell 100 were indicated to be by each with the gestalt of the 1st operation differ a little. For example, by making the configuration of the whole body section housing 80 into Yamagata, in the water recess step 89 prepared along with the outer shell, infiltration inflow becomes easy to escape in an operation of a slant face, and it is still more effective. Moreover, also in the metal shell 100, processus lateralis mallei, such as a bracket, is lost compared with the metal shell 70 of the gestalt of the 1st operation, the whole configuration is made brief, and the direct bolthole 104,105 is formed in the body case. Moreover, unlike the gestalt of the 1st operation, in this example, the point which twists the end of a corrugate tube 40 as a binding tape and a band 34 are also to the metal shell 100, and is binding it tight also strengthens the prefabricated frame structure further.

[0058] Next, drawing 9 is the assembly side-face sectional view showing the gestalt of the 3rd operation concerning this invention. In this case, it is characterized by the point of having formed the one apparatus seal member 140 made of rubber as packing which unified these double-seals member rather than preparing the 1st seal member 55 (85) and the 2nd seal member 27 which were shown with the gestalt of the 1st and 2nd operation of the above.

[0059] That is, the service entrance b1 of the shell plate case B is soon stuck and equipped with the one apparatus seal member 140. The stop pawl 142 is really fabricated inside the body 141, and the one apparatus seal member 140 sticks a body 141 to terminal metallic-ornaments 26b, and is made to engage with the stop hole which formed the stop pawl 142 in the body section housing 110. This has secured the waterproofness between the waterproofness between the terminal metallic ornaments 26 in the service entrance b1 of the shell plate case B, the connector housing 110,120 and the metal shell 13, and the shell plate case B by the single one apparatus seal member 140.

[0060]

[Effect of the Invention] As explained above, the braid as an example of a wrap electromagnetic wave sealed tube is combined with the electromagnetic wave shielding terminal like metal shell for the electromagnetic wave shielding structure equipped with the waterproofness according to claim 1 concerning

this invention by the coupling means in an electric wire. Since the metal shell is combined with the attached body with which ground touch-down of the device side like the shell plate case of a motor was carried out, the electromagnetic wave generated from an electric wire is absorbed by the shielding flow by the path of the shell plate case -> ground touch-down of the body attached [ braid -> coupling means -> metal shell -> ]. On the other hand, although fitting maintenance of the electrical connector housing which consists of body section housing, covering section housing, etc. is carried out at the service entrance of the shell plate case which is the attached body, the waterproofness in the service entrance is secured by the 1st seal member, and storm sewage etc. prevents infiltrating into the interior of a shell plate case from a service entrance. Moreover, water and oil from the interior of a shell plate case are leaked neither to the shell plate case exterior nor the housing exterior by being transmitted to a projection and terminal metallic ornaments inside a shell plate case in the condition of having inserted in body section housing of the above-mentioned electrical connector housing through the 2nd seal member which is made putting terminal metallic ornaments on this part, and is held, without being intercepted by that 2nd seal member and even the conductor of the unreserved condition of an electric wire reaching.

[0061] Moreover, the braid whose electromagnetic wave shielding structure equipped with waterproofness according to claim 2 is an electromagnetic wave sealed tube knits a conductive metal to tubed, and is firmly [ certainly and ] combinable with the electromagnetic wave shielding terminal like metal shell in a washer member and a bolt being about the braid of \*\*. Namely, like structure before, although interstitial segment material, such as a metal network and heat-shrinkable tubing, was needed and the heating facility for carrying out the heat shrink of the heat-shrinkable tubing was needed in order to combine a braid with metal shell, the metal shell as an electromagnetic wave shielding terminal since what is necessary is to use only the easy and positive coupling means of a washer member and a bolt in this invention, it is markedly alike also in cost, and it is cheap, and ends, and the electromagnetic wave shielding structure which is moreover reliable can be acquired.

[0062] moreover, when a washer member is a metal eyelet washer, conventionally, as compared with the coupling means by the metal network and heat-shrinkable tubing of structure, the electromagnetic wave shielding structure equipped with waterproofness according to claim 3 is boiled markedly, and the simplicity of a coupling means and certainty which added the bolt to this eyelet washer increase it.

[0063] moreover , since the electromagnetic wave shielding structure equipped with a waterproofness according to claim 4 be make the septum prepared for the both sides of a part to which electrical connector housing combine Ryobe housing by consist of body section housing and covering section housing become intricate alternately , the complicated clearance form the water flow way like a maze , and the storm sewage which permeated into housing even for a time be guide on the water flow way , and escape to the housing exterior . That is, the structure of electrical connector housing itself is equipped with the waterproofing reproductive function.

[0064] Moreover, the electromagnetic wave shielding structure equipped with waterproofness according to claim 5 Body section housing and covering section housing each by having prepared the road mirage step in the body of a case The external surface of the shell plate case where body section housing which is each phase hand part material at the time of assembly is the attached body at a device side, The storm sewage which the water flow way of a cross-section concave form was formed between the insides of the metal shell whose covering section housing is an electromagnetic wave shielding terminal, and permeated into housing is transmitted in the water flow way of these cross-sections concave form, and escapes to the housing exterior, and \*\*\*\*\* is made.

[0065] moreover , especially the electromagnetic wave shielding structure equipped with a waterproofness according to claim 6 be replace with said road mirage step prepared in body section housing by the gestalt of the 1st operation show in drawing 1 , and if Yamagata like a road mirage step established in body section housing of the gestalt of the 2nd operation show in drawing 6 be make to incline , infiltration inflow become easy to flow and it can heighten the wastewater to the exterior , and the road mirage effectiveness so much .

[0066] Therefore, if above-mentioned claims 4, 5, and 6 are summarized, what is necessary will just be to use the little [ that it is easy as a packing member by India rubber material etc. to have given various waterproofing functions to the structure of electrical connector housing itself, and ] 1st, and 2nd seal member, and effective waterproofness will be acquired.

[0067] Moreover, the electromagnetic wave shielding structure equipped with waterproofness according to claim 7 can attain reduction-ization of member mark further by collecting further the little [ easy and ] 1st [ which was mentioned above ] and 2nd seal member to an one apparatus seal member.

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[Translation done.]

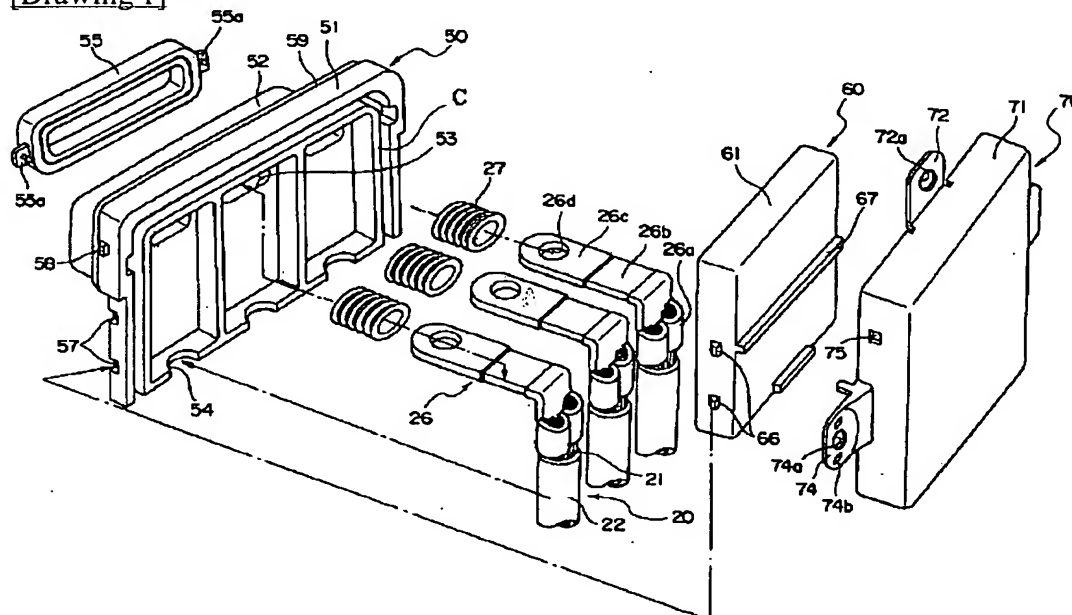
## \* NOTICES \*

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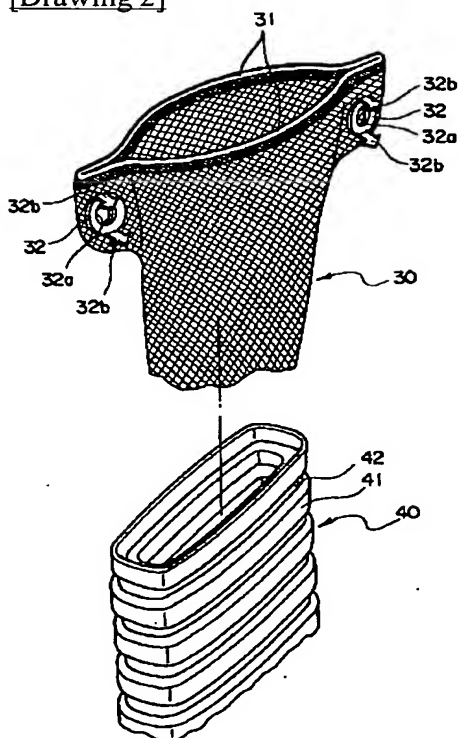
- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

## DRAWINGS

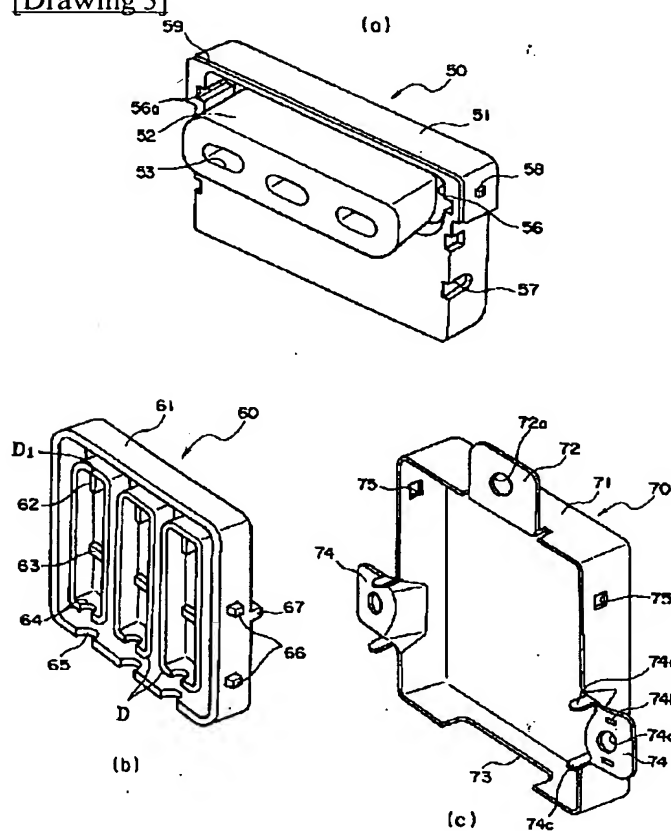
[Drawing 1]



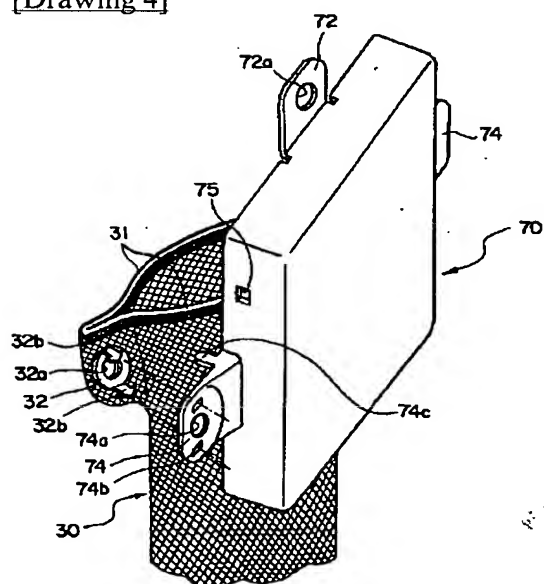
[Drawing 2]



[Drawing 3]



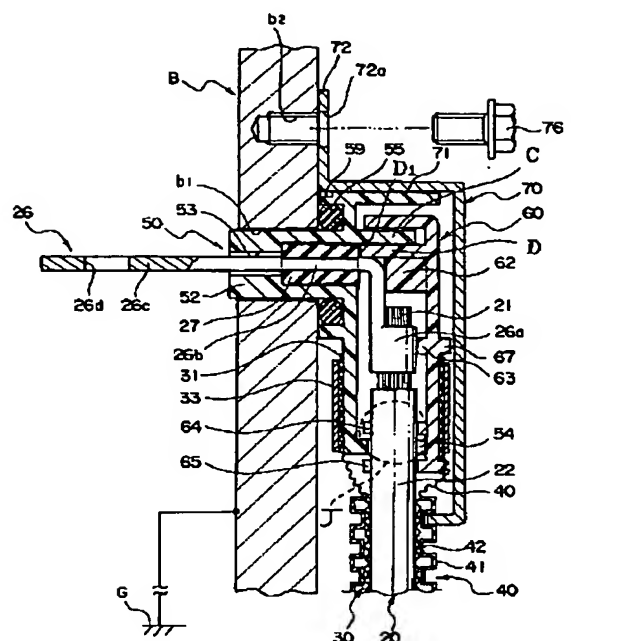
[Drawing 4]



組立—金属シェル結合部：J

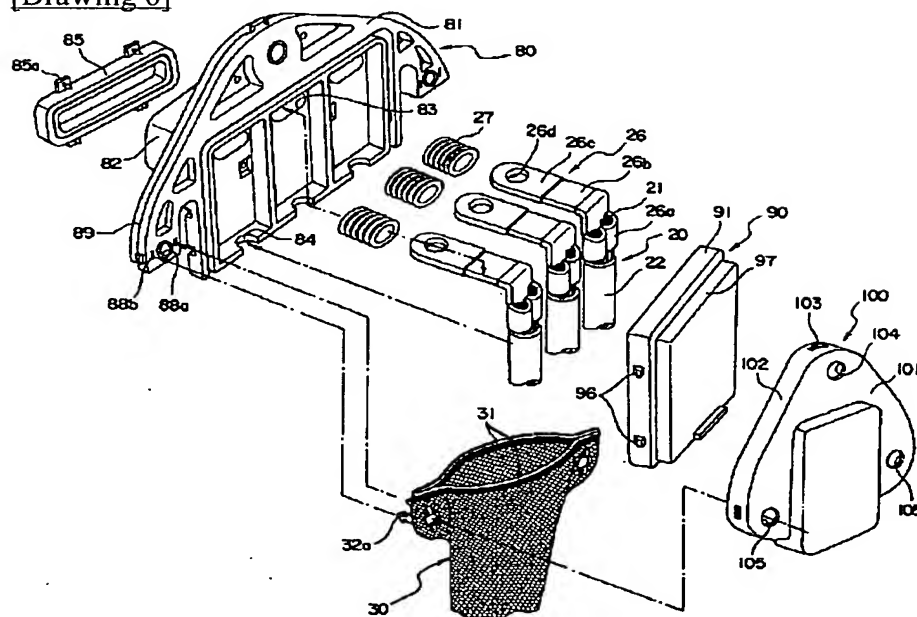
[Drawing 5]



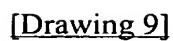
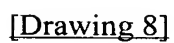


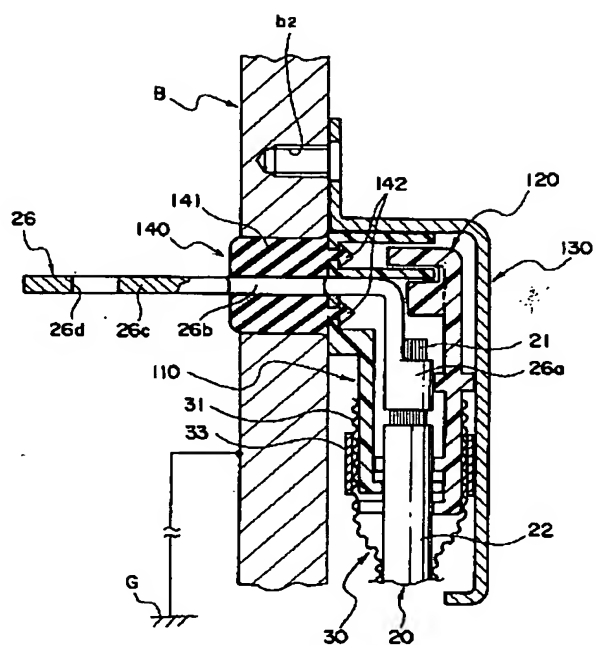
20	ケーブル	60	カバー部ハウジング
21	導体	62, 63	端子押さえ凸部
26	ケーブル金具	64, 65	電線押さえ凹部
26b	端子シールド部	67	逃げ水段部
27	第2のシールド部材	70	金属製シールド（電磁波シールドターミナル）
30	銅組（電磁波シールドチューブ）	76	金属シールド固定用のボルト
31	地目形ワッシャー（鍍金部材）	B	外板ケース（鍍金部材）
40	コルゲートチューブ	b1	電線引き込み口
50	本体部ハウジング	C, D	隔壁（ラビリンスパッキン通水路）
52	嵌合取付部	J	銅組と金属シールドの結合部
53	端子通し孔		
55	第1のシールド部材		
58	逃げ水段部		

[Drawing 6]

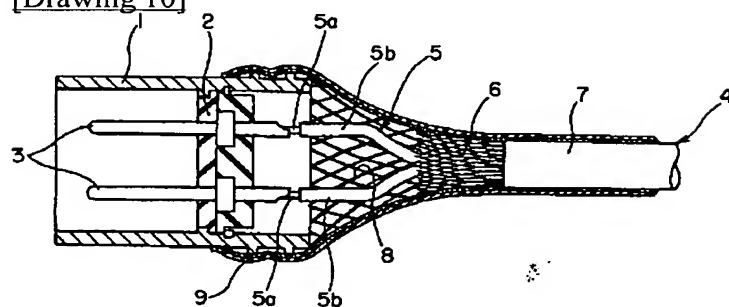


[Drawing 7]

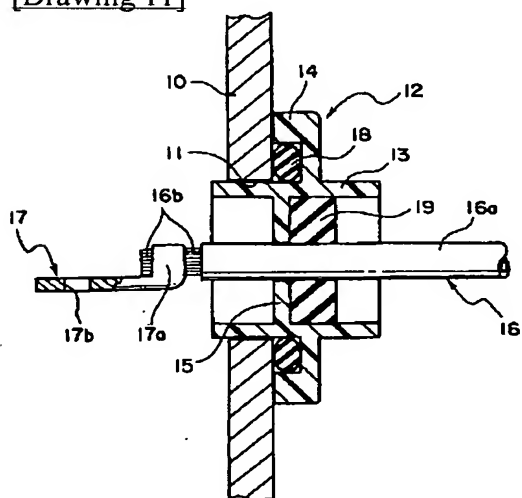




[Drawing 10]



[Drawing 11]



[Translation done.]